8. Form more robust; width of head across eyes is to the greatest width of pronotum as 50:60. Head and pronotum appearing more flattened; antennae longer, 2.80 mm; corium darker, somewhat rusty cinereous; scutellum entirely black; length 4.80–5.00 mm. . . . . *grandis* Baker

Form less robust; width of head across eyes is to the greatest width of pronotum as 45:52; head and pronotum less flattened; antennae shorter, 2.12 mm; scutellum either entirely black or bicolored; size averages smaller, 4.00–4.30 mm long. 9

9. Contracted part of costal margin of corium usually shorter in relation to length of scutellum, about as 15:23, and in relation to the expanded part of costal margin, as 15:75; first segment of rostrum a little shorter than bucculae; scutellum bicolored; length, 4.25–4.50 mm. . . . *angustatus* Baker

Contracted part of costal margin usually longer in relation to length of scutellum, about as 20:24 and in relation to the expanded part of costal margin, as 20:65; first segment of rostrum equal to or a little longer than bucculae; scutellum entirely shining black; length 3.60–4.00 mm. . . . . *thymi* (Wolff)

10. Pronotum short, nearly twice as wide as long (40:22) and subequal to length of head, costal margins of corium usually subparallel to each other, very little if at all expanded posteriorly; basal part of membrane from apex of commissure to apices of coria much shorter than apical part beyond apices of coria; smaller species 3.10–4.00 mm long. . . . . *raphanus* Howard

Pronotum longer, much less than twice as wide as long (45:28) and usually a little longer than head; costal margins of corium not parallel to each other, parallel only at base, thence expanded posteriorly; basal part of membrane from apex of commissure to apices of coria more nearly equal to apical part beyond apices of coria; larger species 3.25–4.50 mm long. 11

11. Corium with erect hairs as well as dense coating of short appressed pubescence; length 3.80 mm. . . . . *monticola* Distant

Corium with appressed pubescence, usually without erect hairs. 12

12. Corium and membrane more or less broadly infuscate; contracted basal part of corium rather densely pilose; length, male, 4.10 mm; female, 4.30–4.50 mm. . . . . *groenlandicus* (Zetterstedt)

Corium and membrane pale, with fuscous markings usually restricted to corial veins; contracted basal part of corium sparsely pilose; length 3.25–3.70 mm. . . . . *ericae* (Schilling)

ZOOLOGY.—*Notes on myiasis of the toad,* Bufo boreas boreas *Baird and Girard.*[1]

MAURICE T. JAMES, Colorado Agricultural Experiment Station, and T. PAUL MASLIN, Colorado A. & M. College.

On July 19, 1946, on a collecting expedition into Jackson County, Colo., the authors observed a case of myiasis of the mountain toad, *Bufo boreas boreas* Baird and Girard. The specimen was collected at an altitude of 9,500 feet in a small swampy meadow near the Columbine Camp Ground, Routt National Forest, U. S. Highway No. 40. When first sighted the toad lay extended on its side in the sun in a small semicleared area. Two large lesions were visible on the exposed flank. After the toad was captured, it was observed that these lesions were clean with smooth raised edges, each one measuring approximately 8 mm in diameter and containing a mass of small maggots. These were not counted, but it was estimated that there were approximately 30 in each lesion. The closely packed maggots were so oriented that their posterior extremities formed a granular pavementlike surface in the opening of the lesion. In addition to these two a third lesion was found on the dorsal surface of the tibia; though smaller, it included about one-half of the tibial gland. One or two maggots were extracted and examined. This disturbance caused the rest of the maggots to move about restlessly and to work deeper into the lesions. The maggots were not all of the same size; they varied from approximately 3 to 4 mm in length. The toad, active and apparently normal in every respect, was placed in a damp bag with three other toads of the same species and brought to Fort Collins, Colo.

On July 20 the bag was opened and the specimens examined. The infected toad was less active than the other three, and its lesions, as well as the maggots within them, were appreciably larger. The flank lesions could be moved freely with the skin over the undamaged body wall beneath; but the

[1] Colorado Agricultural Experiment Station Scientific Journal Series No. 241. Received April 24, 1947.

tibial lesion was seen to involve the underlying muscles.

On July 22 the specimens were again examined. The three uninfected toads appeared perfectly normal, but the infected one was dead. The maggots were much larger and showed definite indications of being negatively phototropic and positively thigmotropic. When left undisturbed they worked in the exposed lesions, but movements of the carcass caused them to retreat to the lower surfaces beneath the mass. The maggots now retained no definite orientation within the extensive lesions but worked independently under the adjacent areas in the cutaneous lymph sinuses or deeper into the abdominal cavity and muscles. As the maggots had still shown no indication of abandoning the carcass, it was transferred from the bag and placed on damp sand in a wide-mouthed jar. This was closed by taping the mouth of a second jar, partly filled with damp mud and sand, to its open end.

On July 23 it was noted that most of the maggots were still feeding and had grown appreciably. The toad was rapidly disintegrating through putrefaction and the action of the maggots. A few maggots had abandoned the carcass and the glass was marked with their tracks. There were also indications in the sand that some of the maggots were seeking retreats to pupate.

During the following three days the substance of the carcass rapidly disappeared and more and more maggots left the carcass for the sand; but a large number still remained in the putrefactive fluid in the sand around the now exposed bones.

Observations were discontinued until July 29. By this time a number of flies had emerged. Though the flies were dead and most of them in a disintegrated condition, a positive determination of *Bufolucilia elongata* (Shannon) was made. No more adults were recovered, but the determination was further confirmed through the examination of dead imagines within the puparia. A total of 76 puparia, either empty or containing dead imagines was obtained, in addition to ten larvae which had been extracted from the lesions on July 23.

On August 2 adults of *Muscina stabulans* (Fallen) began to appear, and on August 5 one adult of *Sarcophaga sarracenioides* Aldrich was obtained. These two species continued to emerge until August 10, by which time 70 individuals of the former and 9 of the latter species had been obtained. On August 19 the disintegrated substrate was torn apart and examined for pupal cases. During this process, five larvae of *Fannia canicularis* (Linnaeus) were obtained; two of these were reared for purposes of confirming the identifications.

All larvae extracted from the lesions on July 23 were *B. elongata*. This fact, together with the lapse of time before the emergence of the other species, indicates with fair certainty that this was the only species involved in the original parasitism. How the subsequent infestation occurred could not be determined. The *Fannia* larvae were undoubtedly scavengers; two of them, indeed, were taken within the eaten-out puparia of *B. elongata*. The *Muscina* larvae, which are notoriously carnivorous in their last instar, may have been responsible for the destruction of the *B. elongata* adults.

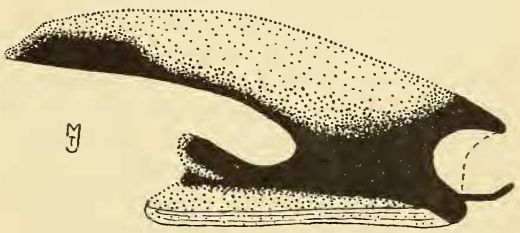

FIG. 1.—*Bufolucilia elongata (Shannon) Pharyngeal sclerite*

The immature stages of *B. elongata* have not been described. The larval material at hand is too scant to permit a detailed description, but enough cephalopharyngeal skeletons were studied by the senior author to permit separation of the third instar, on this basis, from the only other known species of the genus, *B. sylvarum* (Meigen). The characters used are constant for the series studied, which includes cleared material obtained from the puparia, material in situ in the puparia, and a cleared specimen of a larva newly moulted into the third instar.

The larva of *B. sylvarum* was described

and illustrated by Knipling.[2] In *B. elongata* the oral hooks and hypostomal sclerite seem to show no significant differentiating characters. The pharyngeal sclerite (Fig. 1), however, is more robust; the dorsal cornu is more evenly convex and does not bend so strongly ventrad at its apex; and the ventral cornu at its apex does not approach the dorsal cornu so closely. Seemingly the most important differentiating character is the extent of sclerotization, the dorsal cornu being heavily sclerotized along its entire ventral margin, with a prominent expanded area at the apex.

[2] KNIPLING, EDWARD F. Iowa State College Journ. Sci. 10: (3); 275–293. 1936.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

GEOLOGICAL SOCIETY

634TH MEETING

The 634th meeting of the Society was held at the Cosmos Club, January 9, 1946, president W. H. BRADLEY presiding. A memorial to C. W. Gilmore was read by C. LEWIS GAZIN.

Informal communication.—HUGH D. MISER presented statistics on American Association of Petroleum Geologists.

Program.—PHILIP W. GUILD and D. E. FLINT: *Chromite deposits of Camagüey Province, Cuba.* The chromite-bearing ultramafic complex near Camagüey, Cuba, mapped as a part of the program of mineral investigations of the U. S. Geological Survey, consists chiefly of serpentinized peridotite (harzburgite) and dunite, with minor amounts of the feldspathic rocks: gabbro, troctolite, and anorthosite. This complex and the overlying Cretaceous tuffs and limestones were severaly deformed in an orogeny which culminated in extensive thrust faulting, probably in late middle Eocene time. The sedimentary rocks now occur in two synclinal arcs extending across the district parallel to the trace of the thrust. The feldspathic rocks of the complex flank the tuffs along the limbs of the syncline, indicating that they were concentrated in the upper part of the complex.

The chromite occurs as tabular or lenticular bodies of massive, coarse-grained, or occasionally fine-grained disseminated ore. Virtually all the known deposits are near the base of the feldspathic zone, but with an irregular lateral distribution which distinguishes them from the layered chromitites of the Bushveld-Stillwater type. Two possible modes of origin are discussed: (1) segregation of the deposits near the feldspar-peridotite boundary after emplacement of the magma through some process of gravity separation and magmatic flow; (2) differentiation of chromite at great depth before intrusion and transportation of the ore bodies as solid masses to their present position. The grouping into clusters, as though near feeders, and the massive texture and sharp contacts of many of the deposits suggest that the latter hypothesis is more probable.

A practical aspect of the study has been to suggest improvements in the pattern of future geophysical surveys.

JARVIS B. HADLEY: *Corundum deposits in Buck Creek peridotite, North Carolina.*

G. D. ROBINSON: *The 1945 eruption in Tulik Caldera, Umnak Island, Alaska.* The Alaska Peninsula and the Aleutian Islands comprise one of the more active but least known of the series of volcanic arcs which border the Pacific Ocean. The Aleutian volcanic arc includes about 80 large volcanic mountains, of which about 40 are known to have been active, some many times, since 1760, the earliest year of record. In 1945 a spectacular eruption on Umnak Island, third largest of the Aleutians, aroused much attention because it occurred only 9 miles from Fort Glenn, a large Army airbase. The writer observed the eruption at its explosive climax (June 6–June 10), but Lt. Ray E. Wilcox made most of the observations presented.

One of the world's largest calderas, formed by the decapitation of a peak once 7,000 to 10,000 feet high, dominates the northeastern part of Umnak Island. The caldera is $6\frac{1}{2}$ to $7\frac{1}{2}$ miles wide; its rim lies at altitudes of 2,900 to 3,900 feet; its walls drop abruptly 1,000 to 2,000 feet to the caldera floor. Disposed about the floor are nine large volcanic cones and many small ones.

A large cone near the southwestern edge of the caldera floor erupted violently in 1945. The eruption, preceded by a few mild earthquakes late in May, seems to have begun about June 4; on June 6 a dense ash cloud rising to 9,000